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ExtraBees²

VAST 2013 Mini-Challenge 3

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Agenda

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- Introduction: World and data
- Internet/Server communication
  - Data and data model
  - Visualization transformation
  - Visual Information Seeking Mantra
  - Visualization: Network flow
- Intranet communication
  - Data preprocessing
  - Visualization: Bubble cloud
- Live Demo

Introduction: World and data

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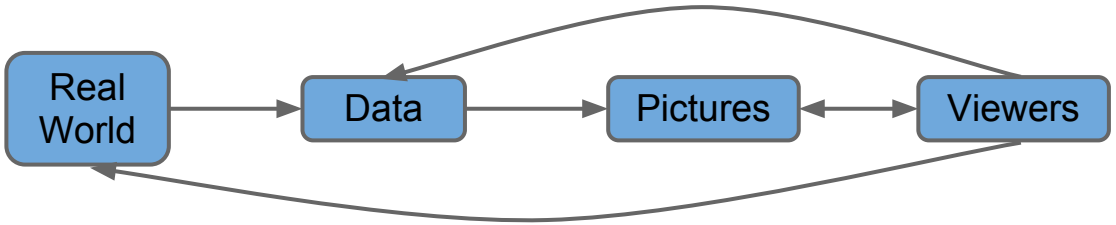
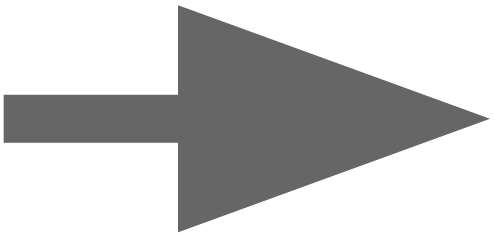
- World: "Big Marketing"
  - large international marketing company
  - three branches with ~400 employees each
- Data sources:
  - Network description
  - Network flow of two weeks
  - Network health and status of two weeks



Visual Information Seeking Mantra:

Overview first, zoom and filter, then details-on-demand

by Ben Shneiderman (1996)

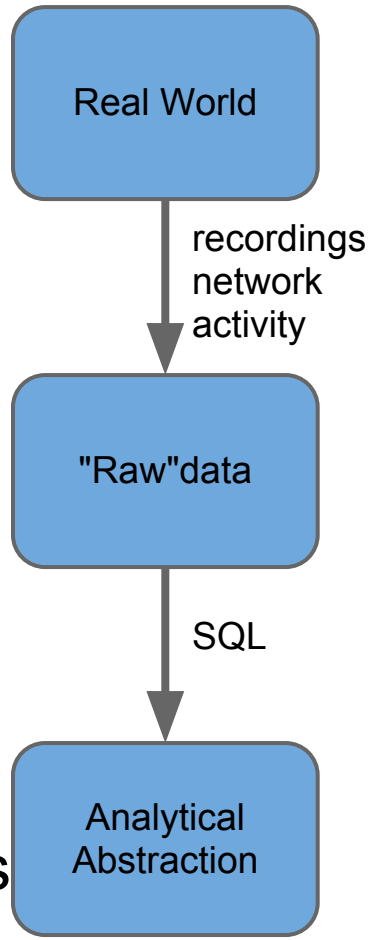


Primary Objective:

User (e.g. admin) should quickly find, identify and analyse problems in order to fix them.

Data and Data Model

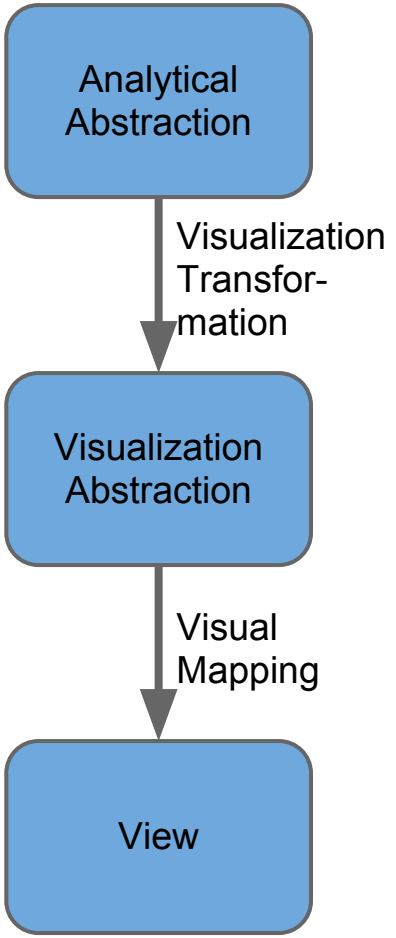
- Network of company with three Sites
  - network traffic and health data.
- Data model: network topology
  - nodes: 3 enterprise sites and internet
  - edges: connection between sites & internet
    - Time-dependent network traffic
- Data model: time-dependent qual./ quan. health data per Server/ Site
- Integration via relational model
  - relational Databases (e.g. MySQL)
- Data Processing/ Transformation
  - filtering/ cleansing: e.g. splitting long entries
  - abstraction: e.g. use of fixed time intervals
  - extraction: traffic/ health per enterprise site



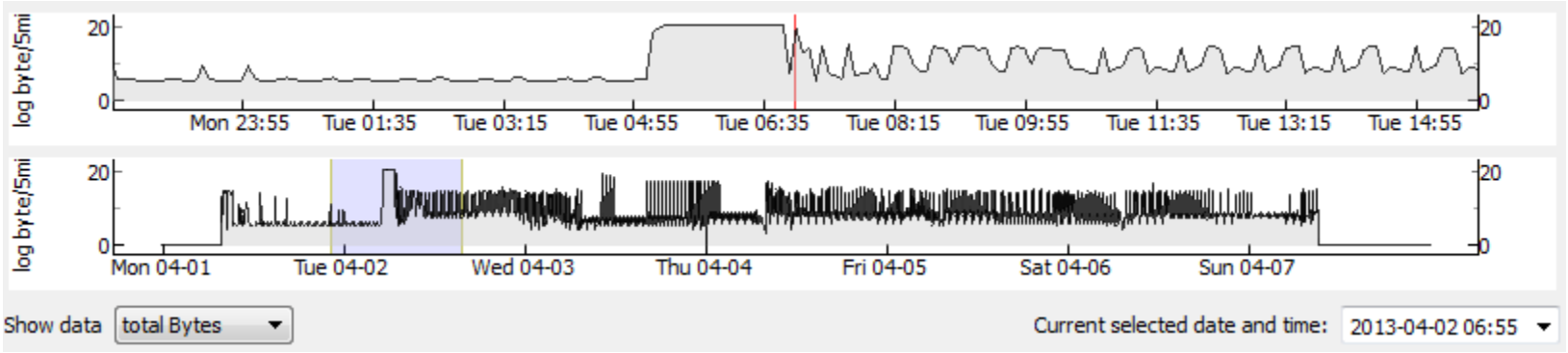
according to Chi (2000)

Visualization Transformation

- Visualization Transformation:
  - Query database to generate time-dependent visualizable network status.
    - e.g. overall traffic load or no. errors/ warnings/ connection timeouts
- Visual mapping:
  - mapping of extracted data to visualization
    - e.g. time-dependent traffic amount to color and width of edges



Visual Information Seeking Mantra:
Overview, zoom, filter



- lower plot shows overview
- upper plot shows move- and scaleable region of the lower plot
- accurate time selection with date field and pop-calendar
- different data sets selectable with combo box

Visual Information Seeking Mantra:
details-on-demand

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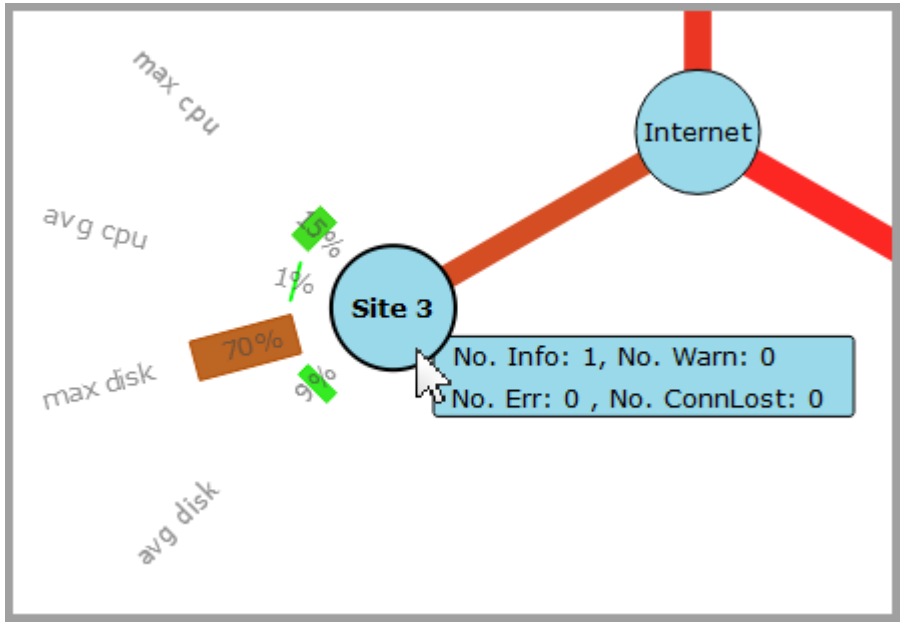
- mouse-hover shows radial oriented bars with information about health values
- mouse-click on a site node locks the visibility of these health values in order to observe changes
- double-click switches to detailed site-view



Visualization: Network flow

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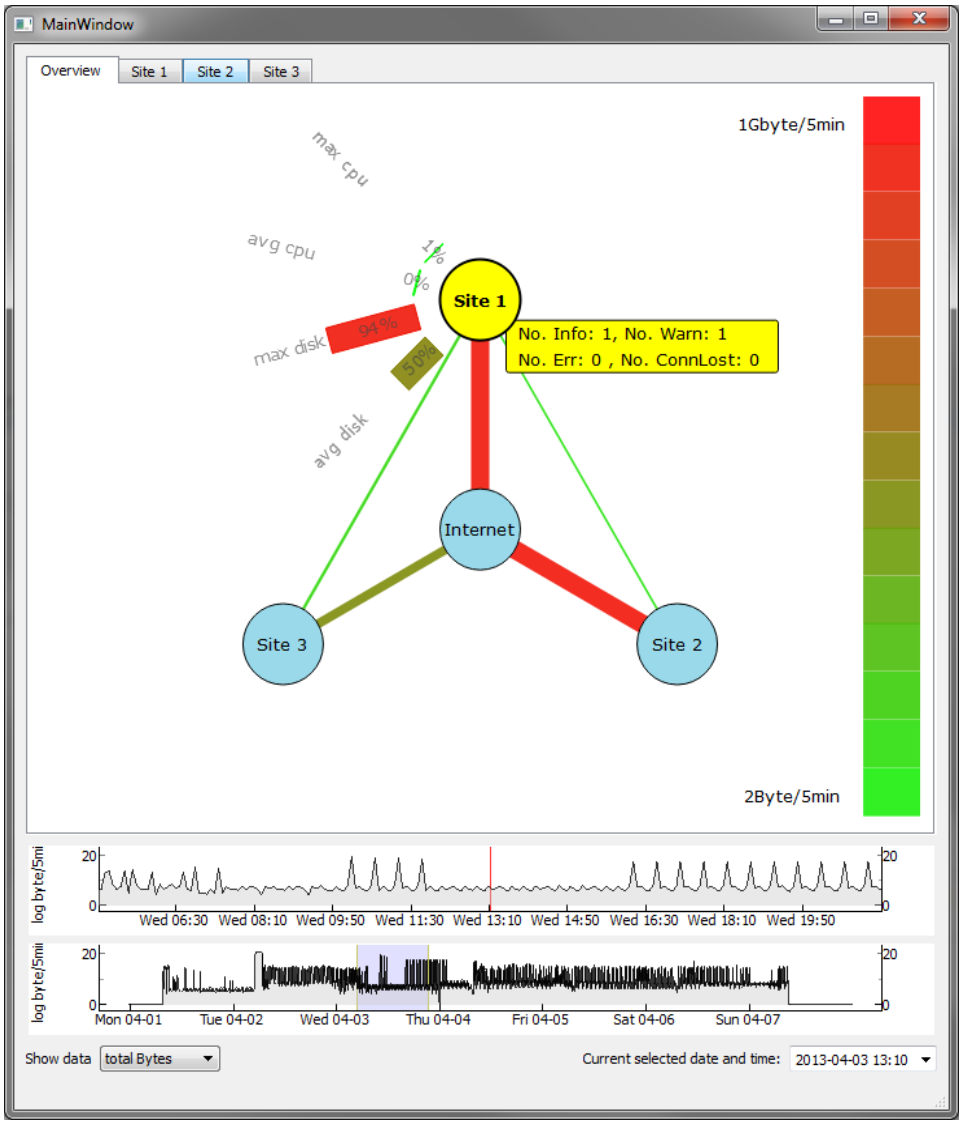
- GUI and network flow visualization written in Python 2.7 using PyQt4
- Flexibility and Extensibility due to use of MySQL Server
  - different views on data
- PyQtGraph-library for real time data plots
  - quick zooming and region selection



Intranet Communication

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- Data preprocessing
- Bubble scene

Data preprocessing

mySQL is used for

- Reduce the amount of the dataset so the visualization can run in real time
- calculate the total workload of every workstation in the company in every 5 minutes interval

  views were used for the calculations

- finding the status health value of workstations in every 5 minute interval

Bubble Scene

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- Fetch and preprocess data from mysql
- Atomic Bubble
  - Mouse Hover Event
- Bubble Animation
  - Resize
  - Relocate
  - Color Change
- Bubble Scene
  - Initialize Scene
  - Keep Tight Algorithm

- Synchronize time stamp with overview tab

References

- Shneiderman B. (1996). The Eyes Have It: A Task by Data Type Taxonomy for Information Visualizations.
- Chi Ed. H. (2000). A Taxonomy of Visualization Techniques Using the Data State Reference Model.

Visualization: Network flow

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Live Demo